41.   (Amended)   A pulse oximeter comprising:

at least first and second light emitting devices;

at least one light detector configured to receive light attenuated by transmission through a body tissue with pulsing blood, the at least one light detector acquiring a first signal based on the first light emitting device comprising a first desired signal portion and a first undesired signal portion and a second signal based on the second light emitting device comprising a second desired signal portion and a second undesired signal portion; and

a closed loop adaptive system responsive to said first and second signals to provide at least first and second output signals for use in calculating oxygen saturation of said blood.

2 42.   (Amended)   The pulse oximeter of Claim 41, wherein the adaptive system executes a least squares algorithm.

4 43.   (Amended)   The pulse oximeter of Claim 41, wherein the adaptive system executes an adaptive algorithm.

3 44.   (Amended)   The pulse oximeter of Claim 42, wherein the adaptive system executes a least squares lattice.

5 45.   (Amended)   The pulse oximeter of Claim 41, further comprising a display coupled to the adaptive system.

6 46.   (Amended)   A pulse oximeter comprising:

at least first and second light emitting devices;

at least one light detector configured to receive light attenuated by transmission through body tissue with pulsing blood, the at least one light detector generating a first signal based on light transmitted from the first light emitting device and a second signal based on light transmitted from the second light emitting device; and

a processor that effects signals representing the first and second signals to provide at least one output signal, wherein the processor adjusts itself to optimize the at least one output signal for use in calculating oxygen saturation.

7 47.   (Amended)   The pulse oximeter of Claim 46, wherein the optimum corresponds to execution of a least squares algorithm to convergence by said processor.

48. (Amended) The pulse oximeter of Claim 47, wherein the least squares algorithm is a component of an adaptive noise canceler.

49. (Amended) The pulse oximeter of Claim 47, wherein the least squares algorithm comprises a least squares lattice.

050. (Amended) The pulse oximeter of Claim 47, wherein the least squares algorithm comprises a least mean squares algorithm.

151. (Amended) The pulse oximeter of Claim 46, further comprising a display coupled to the processor.

152. (Amended) A method of calculating blood oxygen saturation comprising:

transmitting light of at least first and second wavelengths through body tissue carrying pulsing blood to a light-sensitive detector to generate first and second intensity signals;

digitizing the first and second intensity signals; and

processing the first and the second digitized intensity signals to provide first and second processed output signals, wherein the processing comprises monitoring an output of the processing, and in response, adjusting the processing to optimize at least one of said first or second processed output signals; and

calculating oxygen saturation based upon said first and second processed output signals.

53. (Amended) The method of Claim 52, wherein the optimum corresponds to executing a least squares algorithm to convergence.

54. (Amended) The method of Claim 52, wherein the optimum corresponds to executing an error reducing algorithm to convergence.

55. (Amended) The method of Claim 52, wherein the optimum corresponds to executing a least squares lattice.

56. (Amended) The method of Claim 55, wherein the least squares lattice is a component of an adaptive noise canceler.

57. (Amended) The method of Claim 52, further comprising displaying the oxygen saturation.

58. (Amended)   A pulse oximeter comprising:

at least one light detector configured to receive light of at least first and second wavelengths attenuated by transmission through a body tissue with pulsing blood, the at least one light detector generating a first signal based on light of the first wavelength and a second signal based on light of the second wavelength;

an analog to digital converter that digitizes the first and the second signals to produce digitized first and second signals; and

a processor that employs an adaptive algorithm to effect the digitized first and second signals for use in calculating oxygen saturation.

59. (Amended)   The pulse oximeter of Claim 58, wherein the adaptive algorithm comprises a least squares algorithm.

60. (Amended)   The pulse oximeter of Claim 58, wherein the adaptive algorithm comprises a least squares lattice.

61. (Amended)   The pulse oximeter of Claim 60, wherein the adaptive algorithm is a component of an adaptive noise canceler.

62. (Amended)   The pulse oximeter of Claim 58, further comprising a display.

63. (Amended)   A pulse oximeter comprising:

at least one light detector configured to receive light of at least first and second wavelengths attenuated by transmission through a body tissue with pulsing blood, the at least one light detector generating a first signal based on light of the first wavelength and a second signal based on light of the second wavelength;

an analog to digital converter that digitizes the first and the second signals to produce first and second digitized signals; and

a microprocessor that has a routine that executes a least squares algorithm to effect the first and the second digitized signals to produce first and second output signals, the first and second output signals for use in calculating oxygen saturation.

64. (Amended)   The pulse oximeter of Claim 63, wherein the effect from the least squares algorithm is to optimize at least one of the first and second output signals.

65. (Amended)   The pulse oximeter of Claim 63, wherein the least squares algorithm comprises a least squares lattice.

66. (Amended)   The pulse oximeter of Claim 65, wherein the least squares algorithm is a component of an adaptive noise canceler.

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Please add the following new claims.

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276. A method of determining blood oxygen saturation comprising:

transmitting light of at least first and second wavelengths through body tissue carrying pulsing blood to a light-sensitive detector to generate at least one intensity signal;

processing the at least one intensity signal using a closed loop adaptive algorithm to provide at least one output signal; and

calculating oxygen saturation based upon the at least one output signal.

268. The method of claim 27, further comprising converting the at least one intensity signal to a digital representation of the at least one intensity signal, prior to the processing.

269. The method of claim 27, wherein the at least one intensity signal comprises at least a desired portion and a noise portion.

307. The method of Claim 29, wherein the noise portion is caused at least in part by motion of a patient.

317. The method of Claim 29, wherein the noise portion is uncorrelated to the desired portion.

327. The method of Claim 31, wherein the processing reduces the noise portion.

337. The method of Claim 29, wherein the noise portion is erratic.

347. The method of Claim 29, wherein the processing reduces the noise portion.

357. The method of Claim 34, wherein the processing is further based on a principle that the oxygen saturation changes relatively slowly over short periods of time.

367. The method of Claim 29, wherein the processing optimizes the at least one output signal.

377. The method of Claim 76, wherein the optimization is defined as operation of the adaptive algorithm.

41 78.   The method of Claim 76, wherein the processing converges to optimize the output signal based on an error signal.

42 79.   The method of Claim 78, wherein the convergence comprises reducing the error signal to below a threshold.

43 80.   The method of Claim 78, wherein the convergence comprises minimizing the error signal.

38 81.   The method of Claim 77, wherein the adaptive algorithm comprises a least squares algorithm.

39 82.   The method of Claim 77, wherein the adaptive algorithm comprises a least squares lattice.

40 83.   The method of Claim 77, wherein the adaptive algorithm comprises a least mean squares algorithm.

44 84.   The method of Claim 67, wherein the adaptive algorithm comprises a least squares algorithm.

45 85.   The method of Claim 67, wherein the adaptive algorithm comprises a least mean squares algorithm.

46 86.   The method of Claim 67, wherein the adaptive algorithm comprises a least squares lattice.

47 87.   The method of Claim 86, wherein the adaptive algorithm is a component of an adaptive noise canceler.

48 88.   The method of claim 67, further comprising filtering the at least one intensity signal with a predetermined filter, prior to the processing.

49 89.   The method of claim 67, further comprising displaying the oxygen saturation.

50 90. A pulse oximeter comprising:

light emitters that transmit light of at least first and second wavelengths through body tissue carrying pulsing blood to a light-sensitive detector to generate at least one intensity signal; and

a processor that executes an adaptive algorithm to have an effect on the at least one intensity signal, wherein the at least one intensity signal, once effected by the adaptive algorithm, is used in calculating oxygen saturation.

51 91. The pulse oximeter of claim 90, further comprising an analog to digital converter that converts the at least one intensity signal to a digital representation of the at least one intensity signal.

52 92. The pulse oximeter of claim 90, wherein the at least one intensity signal comprises at least a desired portion and a noise portion.

53 93. The pulse oximeter of Claim 92, wherein the noise portion is caused at least in part by motion of a patient.

54 94. The pulse oximeter of Claim 93, wherein the noise portion is uncorrelated to the desired portion.

55 95. The pulse oximeter of Claim 93, wherein the noise is erratic.

56 96. The pulse oximeter of claim 93, wherein the effect comprises at least reducing the noise portion in the at least one intensity signal.

57 97. The pulse oximeter of Claim 96, wherein the effect is further based on a principle that the oxygen saturation changes relatively slowly over short periods of time.

58 98. The pulse oximeter of Claim 92, wherein the effect comprises at least reducing the noise portion in the at least one intensity signal to provide an optimized output signal for use in calculating oxygen saturation.

59 99. The pulse oximeter of Claim 98, wherein the optimum corresponds to converging the adaptive algorithm based on an error signal.

60 100. The pulse oximeter of Claim 99, wherein the converging the adaptive algorithm comprises reducing the error signal to below a threshold.

61 101. The pulse oximeter of Claim 99, wherein the converging the adaptive algorithm comprises minimizing the error signal in a least squares manner.

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62 102. The pulse oximeter of Claim 55, wherein the adaptive algorithm comprises a least squares algorithm.

63 103. The pulse oximeter of Claim 55, wherein the adaptive algorithm comprises a least mean squares algorithm.

64 104. The pulse oximeter of Claim 55, wherein the adaptive algorithm comprises a least squares lattice.

65 105. The pulse oximeter of Claim 64, wherein the adaptive algorithm is a component of an adaptive noise canceler.

66 106. The pulse oximeter of Claim 50, wherein the adaptive algorithm comprises a least squares algorithm.

67 107. The pulse oximeter of Claim 50, wherein the adaptive algorithm comprises a least mean squares algorithm.

68 108. The pulse oximeter of Claim 50, wherein the adaptive algorithm comprises a least squares lattice.

69 109. The pulse oximeter of Claim 68, wherein the adaptive algorithm is a component of an adaptive noise canceler.

110. A pulse oximeter wherein intensity signals resulting from light of first and second wavelengths attenuated by body tissue carrying pulsing blood are effected by the operation of a least squares algorithm, which intensity signals, once effected, are used in the calculation of oxygen saturation.

111. The pulse oximeter of Claim 110, wherein the intensity signals are effected to reduce noise in the intensity signals.

112. The pulse oximeter of Claim 110, further comprising a microprocessor that operates the least squares algorithm, the microprocessor having digital representations of the intensity signals as inputs.

70 113. The pulse oximeter of Claim 112, wherein the microprocessor further operates on a principle that the oxygen saturation changes relatively slowly over short periods of time.

72 114. The pulse oximeter of Claim 71, wherein the least squares algorithm comprises a least squares lattice.

73 115. The pulse oximeter of Claim 171, wherein the least squares algorithm comprises a least mean squares algorithm.

74 116. The pulse oximeter of Claim 171, wherein the noise is caused at least in part by motion of a patient.

75 117. The pulse oximeter of Claim 176, wherein the intensity signals have a desired portion, and wherein the noise is substantially uncorrelated to the desired portion.

76 118. The pulse oximeter of Claim 176, wherein the noise is erratic.

77 119. The pulse oximeter of Claim 170, wherein the effect of the operation of the least squares algorithm is to optimize at least one of the intensity signals.

80 120. The pulse oximeter of Claim 179, wherein the optimum is defined as convergence of the least squares algorithm based on an error signal.

81 121. The pulse oximeter of Claim 179, wherein the least squares algorithm comprises a least squares lattice.

82 122. The pulse oximeter of Claim 121, wherein the least squares algorithm is a component of an adaptive noise canceler.

83 123. The pulse oximeter of Claim 179, wherein the least squares algorithm comprises a least mean squares algorithm.

84 124. A method of determining blood oxygen saturation comprising:

transmitting light of at least first and second wavelengths through body tissue carrying pulsing blood to a light-sensitive detector to generate at least one intensity signal;

processing the at least one intensity signal using a least squares algorithm to provide at least one output signal; and

calculating oxygen saturation based upon the at least one output signal.

85 125. The method of Claim 124, wherein the at least one intensity signal has a desired portion and a noise portion, and wherein the processing reduces noise in the at least one intensity signal.

86 126. The method of Claim 124, wherein the processing is further based on a principle that the oxygen saturation changes relatively slowly over short periods of time.

127. The method of Claim 126, wherein the noise is uncorrelated to the desired portion.

128. The method of Claim 125, wherein the noise is erratic.

129. The method of Claim 125, wherein the noise is caused at least in part by motion of a patient.

130. The method of Claim 124, wherein the least squares algorithm comprises a least mean squares algorithm.

131. The method of Claim 124, wherein the least squares algorithm comprises a least squares lattice.

132. The method of Claim 124, wherein the processing optimizes the at least one output signal, the optimum corresponding to the operation of the least squares algorithm.

133. The method of Claim 132, wherein the processing converges based on an error signal.

134. The method of Claim 124, wherein coefficients applied to the at least one intensity signal by the processing are adjusted as a result of the operation of the least squares algorithm.

135. A method of determining blood oxygen saturation comprising:

transmitting light of at least first and second wavelengths through body tissue carrying pulsing blood to a light-sensitive detector to generate first and second intensity signals;

digitizing the first and second intensity signals to produce first and second digitized intensity signals;

processing the first and second digitized intensity signals to provide first and second output signals, wherein the processing adjusts itself to optimize at least one of the first and second output signals; and

calculating oxygen saturation based upon the first and second output signals.

136.   The method of Claim 135, wherein the processing adjusts itself to optimize at least one of the first and second output signals based on at least one of the first and second output signals.

137.   The method of Claim 135, wherein the optimum corresponds to operation of an error-reducing algorithm.

138.   The method of Claim 137, wherein the error-reducing algorithm is a least squares algorithm.

139.   The method of Claim 138, wherein the least squares algorithm converges based on an error.

140.   The method of Claim 138, wherein the least squares algorithm comprises a least mean squares algorithm.

141.   The method of Claim 138, wherein the least squares algorithm comprises a least squares lattice.

142.   The method of Claim 141, wherein the least squares algorithm is a component of an adaptive noise canceler.

143.   The method of Claim 135, wherein the first and second digitized intensity signals have a desired portion and a noise portion.

144.   The method of Claim 143, wherein the noise portion is uncorrelated to the desired portion.

145.   The method of Claim 143, wherein the noise portion is erratic.

146.   The method of Claim 143, wherein the noise portion is caused at least in part by motion of a patient.

147.   The method of Claim 143, wherein the processing adjusts itself to reduce the noise portion based on at least the first or second output signal.

148.   The method of Claim 147, wherein the processing adjusts itself to reduce the noise portion based on operation of a least squares algorithm.

149.   The method of Claim 148, wherein the processing is further based on a principle that the oxygen saturation changes relatively slowly over short periods of time.

150.   The method of Claim 148, wherein the adjustment comprises adjusting coefficients applied to the first and second digitized intensity signals.

111 ~~151~~. 105 The method of Claim 148, wherein the least squares algorithm converges based on an error.

112 ~~152~~. 105 The method of Claim 148, wherein the least squares algorithm comprises a least mean squares algorithm.

113 ~~153~~. 105 The method of Claim 148, wherein the least squares algorithm comprises a least squares lattice.

114 154. The method of Claim 153, 113 wherein the least squares algorithm is a component of an adaptive noise canceler.

115 155. A method of determining blood oxygen saturation comprising:

transmitting light of at least first and second wavelengths through body tissue carrying pulsing blood to a light-sensitive detector to generate first and second intensity signals;

digitizing the first and second intensity signals to produce first and second digitized intensity signals;

processing the first and second digitized intensity signals to provide first and second processed intensity signals, wherein the processing employs a predetermined algorithm that adjusts coefficients applied to the first and second digitized intensity signals, based on an output of the processing, in order to optimize at least one of the first and second processed intensity signals; and

determining blood oxygen saturation from the first and second processed intensity signals.

116 156. The method of Claim 155, wherein the predetermined algorithm comprises a least squares algorithm.

117 157. The method of Claim 155, wherein the predetermined algorithm comprises a least squares lattice.

118 158. The method of Claim 157, wherein the predetermined algorithm is a component of an adaptive noise canceler.

119 159. The method of Claim 155, wherein the predetermined algorithm comprises a least mean squares algorithm.

120 160. The method of Claim 115, wherein the first and second digitized intensity signals have a desired portion and a noise portion.

121 161. The method of Claim 120, wherein the noise portion is uncorrelated to the desired portion.

122 162. The method of Claim 120, wherein the noise portion is erratic.

123 163. The method of Claim 120, wherein the noise portion is caused at least in part by motion of a patient.

124 164. The method of Claim 123, wherein the predetermined algorithm adjusts the coefficients to reduce the noise portion.

125 165. The method of Claim 120, wherein the predetermined algorithm adjusts the coefficients to reduce the noise portion.

126 166. The method of Claim 125, wherein the processing is further based on a principle that the oxygen saturation changes relatively slowly over short periods of time.

127 167. The method of Claim 125, wherein the predetermined algorithm comprises a least squares algorithm.

128 168. The method of Claim 125, wherein the predetermined algorithm comprises a least squares lattice.

129 169. The method of Claim 128, wherein the predetermined algorithm is a component of an adaptive noise canceler.

130 170. The method of Claim 125, wherein the predetermined algorithm comprises a least mean squares algorithm.

171. A pulse oximeter wherein intensity signals resulting from light of first and second wavelengths attenuated by pulsing blood are effected by operation of an algorithm that responds to at least one error signal, wherein the intensity signals, after being effected, are used in the calculation of oxygen saturation.

172. The pulse oximeter of Claim 171, wherein the effect is reducing noise in the intensity signals.

133 173. The pulse oximeter Claim 172, wherein the effect is further based on a principle that the oxygen saturation changes relatively slowly over short periods of time.

174.   The pulse oximeter of Claim 172, wherein the algorithm adjusts the effect on the intensity signals to minimize the at least one error signal.

175.   The pulse oximeter of Claim 172, wherein the noise comprises motion artifact noise.

176.   The pulse oximeter of Claim 171, wherein the algorithm adjusts the effect on the intensity signals to optimize at least one output signal resulting from the operation of the algorithm.

177.   The pulse oximeter of Claim 176, wherein the algorithm adjusts the effect on the intensity signals to minimize the at least one error signal.

178.   The pulse oximeter of Claim 176, wherein the algorithm comprises a least squares algorithm.

179.   The pulse oximeter of Claim 176, wherein the algorithm adjusts the effect on the intensity signals by adjusting coefficients applied to the intensity signals.

180.   The pulse oximeter of Claim 171, wherein the algorithm comprises a least squares algorithm.

181.   The pulse oximeter of Claim 171, wherein the algorithm comprises a least mean squares algorithm.

182.   The pulse oximeter of Claim 171, wherein the algorithm comprises a least squares lattice.

183.   The pulse oximeter of Claim 171, wherein the error signal comprises a comparison between a signal and an estimate of the signal.

184.   The pulse oximeter of Claim 183, wherein the estimate of the signal comprises a prediction of the signal.

185.   A pulse oximeter wherein a signal and an estimate of the signal are compared in order to produce an effect on intensity signals resulting from light of first and second wavelengths attenuated by pulsing blood, which intensity signals are then used in the calculation of oxygen saturation.

186.   The pulse oximeter of Claim 185, wherein the effect is reducing noise in the intensity signals.

147 187. The pulse oximeter of Claim 186, wherein the noise comprises motion artifact noise.

148 188. The pulse oximeter of Claim 166, wherein the noise is erratic.

149 189. The pulse oximeter of Claim 186, wherein the effect on the intensity signals is adjusted to optimize the reducing of noise in the intensity signals.

150 190. The pulse oximeter of Claim 189, wherein the optimization is defined as convergence of a least squares algorithm.

151 191. The pulse oximeter of Claim 190, wherein the least squares algorithm comprises a least mean squares algorithm.

152 192. The pulse oximeter of Claim 190, wherein the least squares algorithm comprises a least squares lattice.

153 193. The pulse oximeter of Claim 185, wherein the estimate of the signal comprises a prediction of the signal.

194. In a pulse oximeter, a processor that adjusts its own transfer function using a least squares algorithm to effect intensity signals resulting from light of first and second wavelengths attenuated by pulsing blood in a patient.

195. The processor of Claim 194, wherein the effect of the least squares algorithm upon convergence is to optimize the intensity signals for use in calculating oxygen saturation.

196. The processor of Claim 194, wherein the intensity signals have at least a desired portion and a noise portion.

197. The processor of Claim 196, wherein the effect is to reduce the noise portion.

198. The processor of Claim 197, wherein the noise portion is uncorrelated to the desired portion.

199. The processor of Claim 198, wherein the effect is to reduce the noise portion.

200. The processor of Claim 196, wherein the noise portion is at least partially caused by motion of a patient.